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46. *Silene inflata*, Smith ; *Cucubalus Echen*, L.—This species of *Silene* presents an interesting case of dimorphism. It produces two kinds of flowers on different plants, both of which are fertile, but with the peculiarity that one of the forms is pistillate only.

In the latter the styles, which are usually tipped with pink, protrude at an early stage of the flower, and finally attain nearly double the length of the calyx. The petals and calyx are smaller than in the other form, the latter more exactly ovate, as Linnæus describes it, and its color, whether green or mottled, is duller. The base of the styles forms a disk on the top of the ovary in both cases, but in the pistillate plant this is more prominent, giving it when mature an elongated ovate form, whereas that of the staminate plant is more exactly ovate, just the opposite to the relation of the calyces. It is this disk which splits into the six teeth by which the capsule opens. The number of styles is commonly three ; in three cases, however, I found four styles, and once, only two. If we open the calyx of a well advanced flower, we find the ovary surrounded to about half its height by ten abortive stamens, but at an early stage of the flower these stamens will be found to be perfectly formed. As the pistil must be fertilized from without, we may suppose, with Darwin, that it matures vigorously and exhausts the support which would otherwise go to the stamens ; whether they have a hereditary taint, I am unable to state, but it is probable ; the point might be determined by destroying the styles at their first appearance. Gärtner, as quoted by Darwin (*Plants & Animals under Domestication*, page 166, *Eng. ed.*), ascribes such *tabescence* in *Silene* to an inherent tendency to become dioecious. I have not had the original to consult. Let us hope that some day New York may possess a Botanical Library : we have a fine foundation in Dr. Torrey's.

In the other form of flower there are ten stamens and three styles. The five outer stamens, alternating with the petals, are the first to elongate, and when the petals open attain the length of the styles in the flower which is pistillate only, and then open and discharge their pollen. At this stage of the flower the five inner stamens, which are opposite to and adhere by their bases to the claws of the petals, occupy with the styles of the same length the throat of the corolla. They do not, however, seem to discharge their pollen, till they and the styles have overtaken the other anthers. The anthers are attached by a point only, are introverse, and soon drop off, whether by the action of the wind or insects. The split of the anthers and the tops of the filaments are usually pinkish ; in the majority of cases the young ovary is a deep pink, a color which it afterwards in a great measure loses ; the ovary of the pistillate form is generally green, but I have seen the cases reversed. The calyx of the staminate flowers is generally readily distinguished by a brighter pink.

Except in size the bi-lobed petals of both kind of flowers are nearly alike, perhaps the shoulders of the claws in the staminate form are broader in proportion, and the claws in general more specialized in form, both being moulded to the young stamen. In the half opened flowers the claws overlap in front of the petals, present-

ing something like a crown. The lobes are of a thicker texture than the claws, and of a dead white color, whereas the claws are translucent: the two are readily pulled apart. In the young petal a strong midrib seems to pass through the base of the claw from front to back and thence to run up to the lobes, where it branches variously, but the only other nerves of the claw are two faint ones continued up near the outside margin of the lobes. At the top of the claw, from the bilobation of the petal, is a pretty deep groove, marked at its commencement by two strong convexities, which have probably been mistaken for the crown of the petals as they have no other. I am satisfied that these are only convexities of the claw, the tissue being thin, and the concavities on the opposite side manifest. I have gone into these details, as I think this structure throws light on the question of the origin of the crown in *Silene*. In the staminate flowers there is a pink nectariferous spot, more or less conspicuous, where the lobes meet the groove.

The duller color of the pistillate form, and the somewhat greater predominance of the family pink in the other, may perhaps be explained by reference to wind and insect agency. The nice taste of insects for color can have escaped no one who has attended to the fertilization of flowers. There are some broad views on this subject in the admirable article in the *American Naturalist* for July, translated by R. L. Packard from Muller and Delpino.

It would be interesting to compare the average number and weight of the seeds of the two kinds of capsules, and also to watch how the agency of insects is employed in the fertilization. I have not had the opportunity of doing this myself, being indebted to my friend Mr. Le Roy for supplies of the flower. It is abundant in some parts of Westchester Co., and the two kinds grow in company.

I have not been able to find any notice of the dimorphism of this plant, later than Linnæus, who (*Spec. Plant. Ed. 3.*) after describing *Cucubalus Behen*, has these words:

"Varietas feminea in Horto upsaliensi frequens. Hæc Hermaphrodito minor. Calyces exacte ovati, magis obscuri nec oblongo-ovati. Corolla minor. Stamina corolla dimidio breviora terminata tuberculo absque antheris. Styli 3-5 corolla longiores declinati. Planta utraque fertilis."

The only other instances of dimorphism that I can recall occur in *Lythraceæ*, *Rubiaceæ* and *Primulaceæ*, with a tendency to it in *Polemoniaceæ*. All these orders, including *Caryophyllaceæ*, have generally opposite or whorled leaves. Having formed a theory, which was strengthened by this consideration, I thought the *Gentian* family a suitable one to investigate for other examples. In looking over my not very extensive collection I was fortunate to find in *Menyanthes trifoliata*, L., a decided case of dimorphism, though the style in all the flowers finally becomes much elongated. The fact is of interest, but the theory halts, for *Menyanthes* belongs to the section of *Gentianaceæ* with alternate leaves. W. H. L.

47. *Linnæa borealis*, Gron.—You remember the doubts about the plant which I found at Babylon, L. I., in 1868, and which I have insisted was *Linnæa*. Well, while I was at Crown Point, I came upon the same plant, but there were no flowers. After considerable